

## **AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

### **LISTING OF CLAIMS:**

Claim 1 (currently amended):           A semiconductor laser comprising:

- an active region (12) which, in response to a pumping energy applied thereto, ~~can produce~~ produces a stimulated emission of radiation with a central wavelength ( $\lambda$ ) in the far infrared region, and

- at least one confinement region (16, 18, 22) ~~suitable~~ for confining the radiation in the active region (12) and comprising at least one interface (16a, 16b, 22a) between adjacent layers ~~that is capable of~~ for supporting surface plasmon modes generated by an interaction of the interface with the radiation,

~~characterized in that~~ wherein

the at least one confinement region (16, 18, 22) comprises a wave-guide layer (16) which is delimited on opposite sides by a first interface and by a second interface (16a, 16b), the guide layer (16) being doped in a manner such that the first and second interfaces (16a, 16b) ~~are capable of supporting~~ support the plasmon modes, respectively, and the guide layer (16) being of a thickness (d) such as to bring about the accumulation of the plasmon modes in proximity to the first and second interfaces (16a, 16b), outside the layer (16), and substantially a suppression of the plasmon modes, inside the layer.

Amendment Under 37 C.F.R. § 1.111

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Claim 2 (currently amended): A laser according to Claim 1 ~~in which~~ wherein the plasmon modes of the first and second interfaces (16a, 16b) are mutually coupled.

Claim 3 (currently amended): A laser according to Claim 2 ~~in which~~ wherein the wave-guide layer (16) has a dielectric constant ( $\epsilon_1$ ) with a negative real part and is interposed between regions (12, 18) having a dielectric constant ( $\epsilon_2$ ) with a positive real part but with a module substantially of the same order as the dielectric constant ( $\epsilon_1$ ) of the guide layer.

Claim 4 (currently amended): A laser according to Claim 3 ~~in which~~ wherein the real part of the sum of the dielectric constants of the guide layer (16) and of the regions (12, 18) between which the layer is interposed is substantially of the order of the imaginary part of the sum.

Claim 5 (currently amended) A laser according to claim 1 ~~in which~~ wherein the active region (12) comprises a quantum-cascade active region.

Claim 6 (currently amended): A laser according to Claim 5 ~~in which~~ wherein the active region comprises a structure with GaAs/Al<sub>0.15</sub>Ga<sub>0.85</sub>As superlattices of non-uniform period.

Claim 7 (currently amended) A laser according to claim 1 ~~in which~~ wherein the guide layer (16) is interposed between the active region (12) and a substrate region (18).

Claim 8 (currently amended) A laser according to Claim 7 ~~in which~~ wherein the wave-guide layer (16) is in contact with the active region (12).

Claim 9 (previously presented) A laser according to claim 1, further comprising a first electrical contact region (20) disposed directly on the guide layer (16).

Claim 10 (previously presented): A laser according to claim 1, further comprising a second electrical contact region (22) disposed directly on the active region (12).

Claim 11 (previously presented): A laser according to claim 1, ~~characterized in that it~~ wherein the laser produces a stimulated emission of radiation with a frequency of between 1 and 10 THz.

Claim 12 (currently amended) A laser according to claim 1 ~~in which~~ wherein the thickness (d) of the wave-guide layer (16) is of the order of 100 nm.

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	Claim 13 (currently amended)	A laser according to claim 1 <del>in which</del> <u>wherein</u> the
		wave-guide layer (16) is formed by an n-type semiconductor in which the concentration of
		electrons is of the order of $10^{18} \text{ cm}^{-3}$ .